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JC813 U.S. PTO

09/659649



09/12/00

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Patentanmeldung Nr. Patent application No. Demande de brevet n°

99480113.2

Der Präsident des Europäischen Patentamts;  
Im Auftrag

For the President of the European Patent Office

Le Président de l'Office européen des brevets  
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I.L.C. HATTEN-HECKMAN

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**Blatt 2 der Bescheinigung  
Sheet 2 of the certificate  
Page 2 de l'attestation**

Anmeldung Nr.:  
Application no.: 99480113.2  
Demande n°:

Anmeldetag:  
Date of filing: 21/10/99  
Date de dépôt:

Anmelder:  
Applicant(s):  
Demandeur(s):  
International Business Machines Corporation  
Armonk, N.Y. 10504  
UNITED STATES OF AMERICA

Bezeichnung der Erfindung:  
Title of the invention:  
Titre de l'invention:

Files transfer between a remote home server and a local server

In Anspruch genommene Priorität(en) / Priority(ies) claimed / Priorité(s) revendiquée(s)

Staat:  
State:  
Pays:

Tag:  
Date:  
Date:

Aktenzeichen:  
File no.  
Numéro de dépôt:

Internationale Patentklassifikation:  
International Patent classification:  
Classification internationale des brevets:

/

Am Anmeldetag benannte Vertragsstaaten:  
Contracting states designated at date of filing: AT/BE/CH/CY/DE/DK/ES/FI/FR/GB/GR/IE/IT/LI/LU/MC/NL/PT/SE  
Etats contractants désignés lors du dépôt:

Bemerkungen:  
Remarks:  
Remarques:

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## FILES TRANSFER BETWEEN A REMOTE HOME SERVER AND A LOCAL SERVER

### Technical field

The present invention relates to files transfer between a  
5 remote server and a local server. Such a transfer is necessary  
when a user is temporarily connected to a local server  
different from a remote home server to which this user is  
usually connected.

### Background art

10 It is now very common that someone who travels needs to have  
access to a set of files, system files, data files or  
application files. So, this person can bring a portable  
computer with him, all the necessary files being stored in  
this computer. It is often not very convenient to carry such  
15 an equipment. Moreover, nowadays, the files of a computer user  
are often stored on a server, the home server. In this case,  
the user has to transfer all his files on the portable  
computer and he can forget some of these files. Thus,  
solutions have been developed to allow a user to access  
20 transparently to his own computer from another personal  
computer, generally by means of a local server.

A first method, TELNET, allows a user connected to a network  
with a local computer to access a remote computer such that  
the local computer is a terminal of the remote computer. The  
25 term TELNET refers to a remote connection on the INTERNET that  
is made with the TELNET protocol. When using electronic mail  
or FTP, a file transfer protocol, the local computer limits

the interaction with the remote computer and the file management between both computers is not very practical.

It is also possible to open an interactive session with TELNET. Accordingly, once the connection has been established,

5 the local computer is transparent and the user works as if he were directly attached to the remote computer. During the session, both computers are connected, what means that access times could be long, especially when the remote computer is overburdened.

10 Another method is known as directory replication, a feature offered by servers equipped with MICROSOFT WINDOWS NT (registered trademark). Directory replication allows to set up and maintain identical directories on multiple stations such as servers or personal computers. Updates made to the files or  
15 directories on one server are periodically replicated to other stations in import directories. Replication is well adapted for read only files since import directories that receive copies of the files are overwritten each time replication occurs. Any modification made on a file in an import directory  
20 is lost at the next replication. Consequently, the user cannot be sure that the modifications he has made in an import directory will be saved ; the saving procedure has to be done manually, by means of specific commands.

### **Summary of the invention**

25 It is therefore a general object of the present invention to provide for a method which allows to access a file in a remote computer from a local computer in an efficient way and to insure that any modification of this file is saved.

According to the invention, in a remote computer, a method for providing a file comprises the following steps:

- receiving a request for this file,
- identifying this file as being stored in a distant  
5 server,
- requesting the distant server to send the file,
- identifying this file as being used, and
- forwarding this file.

Besides, in a local server, a method for transferring a file  
10 from a home server comprises the following steps :

- receiving a request for this file, this request comprising the home server identification,
- checking that this file is not locally stored,
- requesting this file to the home server,
- 15 • identifying the file as being locally used, and
- forwarding said file.

A method for sending back the file to the home server, wherein is stored an information according to which said file is locally stored, comprises the following steps :

- 20 • receiving a request for this file, the request comprising the home server identification,
- checking that the file is locally stored,
- forwarding the file to the home server when it has been locally modified, and
- 25 • deleting the information according to which this file is locally stored.

Advantageously, this method comprises a further step for sending an information to the home server when the file has  
30 not been locally modified.

### Brief description of the drawings

Embodiments of the present invention are described below by way of example only with reference to the accompanying drawings, wherein:

5 Figure 1 represents the equipments involved in the invention,

Figure 2 represents the main components of a local file server,

10 Figure 3 represents the main components of a home file server,

Figure 4 is a diagram showing the messages exchange between the client, the local server and the home server, and

Figure 5 is a flow chart of the method used in the local server.

### 15 Detailed description of the invention

With reference to figure 1, a personal computer or client 10 is connected to a local file server 11 by means of a local area network 12 itself connected to a wide area network 15, generally with a router 14. In addition, a remote home file  
20 server 17 is also connected to the wide area network 15 such as Internet either directly or through another router (not shown) and another local area network (not shown).

With reference to figure 2, the local file server 11 comprises a first LAN adapter, 21 where LAN means "Local Area Network".  
25 This adapter is used to transmit and receive messages on the network with the client 10 and with the home file server 17. Another component of the local file server 11 is a first disk



controller 22 such as a SCSI adapter (SCSI for "Small Computer System interface") or a RAID adapter (RAID for "Redundant Array of Inexpensive Disks"). The local server also comprises a first processor 23 to perform the method which will be  
5 described further.

The local file server 11 comprises in addition a first memory 25 which includes two specific tables, the local client table LT1 and the guest client table GT1. Each entry in these tables corresponds to a user and gives a pointer on one directory  
10 called the directory file.

With reference to figure 3, the remote home file server 17 is very similar to the local file server 11. It comprises a second LAN adapter 31, a second disk controller 32, a second processor 23 and a second memory 35. This memory includes also  
15 a local client table LT2, a guest client table GT2 and it further includes a remotely logged client table RT2.

With reference to figure 4, a file transfer between the home file server 17-402 and the client 10-400 will now be described. There is a set of messages between the client and  
20 the local server 11-401 and another set of messages between the local server and the home server. There is no direct exchange between the client 400 and the home server 402.

When the client or personal computer 400 is powered on, it first runs the BIOS program 403 stored in a read only memory  
25 located in a LAN adapter. The BIOS program performs a remote boot 406 on the local file server 401, using any usual protocol such as DHCP ("Dynamic Host Configuration Protocol") or BOOTP ("Bootstrap protocol"). The BIOS program sends a Connection request 404 to the local server 401 which sends

back a login application 405. The adapter of the personal computer 400 uses a file transfer protocol such as TFTP ("Trivial File Transfer Protocol"), FTP ("File Transfer Protocol") or CIFS ("Common Investment File System") for  
5 downloading this login file from the local server 401. Subsequently, the personal computer 400 runs the login file which prompts a user of this computer to enter a user identification and eventually a password 407. The local file server 401 checks whether the user is one of its clients or  
10 not referring to the first local client table LT1 408. Assuming the user is not one of its clients and is a guest, this user should be stored in the guest client table GT1 if this not already done. The local server now requests the user to enter a home file server identification 409-410. When this  
15 identification is received, the local server forwards 411 the client request to the home file server 402. In response, the home server checks 412 that the user is one of its clients (referring to the second local client table LT2 for instance) and acknowledges 413 the local server to accept this user. In  
20 addition, the home server informs the local server of the operating system files needed for this user. Usually, most of these files are available at the local server and therefore need not to be transferred between both servers. Eventually, the home server sends a file including user specific data. The  
25 local server can transfer the operating files to the client station 414 and the personal computer 400 can perform the loading of the operating system 415.

Additional information on Internet protocols can be found in a IBM Company publication entitled : TCP/IP tutorial and  
30 technical overview GG24-3376-05, October 1998, edited by the International Technical Support Organization.

With reference to figure 5, a file transfer 50 is now described from the local server. First, a test 51 determines whether the client (user) using the client station is a guest or a local known client.

5

- If the client is a local known user ("no" answer), the requested file is simply transmitted to the client 54.

10

- If the client is a guest and requests a new file transfer, the local server first checks 52 whether the file is in the local client directory or not by means of the guest client table GT1.

15

- If the file is in the local server ("yes" answer), the local server sends the file to the client 54.

20

- If the file is not in the local server ("no" answer), the local server requests the file to the home server 53, stores this file in its memory and its identification in the guest client table, and then forwards the file to the client. The files modifications made by the client on the personal computer are saved in the local server, what is state of the art. Moreover, an indication that the file has been modified is stored in the guest client table. According to an optional feature, this indication is also forwarded to the home server.

25

On the other hand, when this file is requested by the home server, the local server checks whether it has been modified or not.

- If the file has not been modified (answer "no"), this information is forwarded to the home server.

- If the file has been modified (answer "yes"), the modified file is forwarded to the home server.

In any case, the file is deleted and the identification of this file is removed from the guest client table GT1.

5 In the home file server 17, when a file has been requested by a first local server, or when according to the above mentioned optional feature a file is modified in this local server, a corresponding information is stored in the remotely logged client table RT2 together with the identification of the local  
10 server. Thus, when later this file is requested again by the user from another server or from the home server itself, the home server first checks if it appears in the remotely logged client table RT2. If it is the case, this file is first requested to the local server identified in the table RT2 and  
15 it is overwritten on the version stored in the home server. The information according to which the file is in the first local server is then deleted in the remotely logged client table RT2.

It then appears that the latest version of the file is always  
20 available, either in the home server or in a server identified in a table of the home server.

The scope of the present invention is in no way limited to the above embodiments. In particular, any means or steps could be replaced by equivalent means, respectively steps.

## CLAIMS

1. A method for providing a file comprising the following steps:
  - receiving a request for said file,
  - 5   • identifying said file as being stored in a distant server,
  - requesting said distant server to send said file,
  - identifying said file as being used, and forwarding said file.
  
- 10 2. A method for providing a file comprising the following steps :
  - receiving a request for said file, said request comprising a home server identification,
  - checking that said file is not locally stored,
  - 15   • requesting said file to said home server,
  - identifying said file as being locally used, and
  - forwarding said file.
  
3. A method for providing a file, wherein is stored an information according to which said file is locally stored  
20 when said file is received from a remote server, said method comprising the following steps :
  - receiving a request for said file, said request comprising said remote server identification,
  - checking that said file is locally stored,
  - 25   • forwarding said file to said remote server when said file has been locally modified, and
  - deleting the information according to which said file is locally stored.

4. The method according to claim 3 further comprising a step for sending an information to said remote server when said file has not been locally modified.
5. A server (17) comprising means for carrying out the steps  
5 of the method according to claim 1.
6. The server (17) according to claim 5 comprising a remotely logged client table (RT2) table for identifying where said file has been forwarded.
7. A server (11) comprising means for carrying out the steps  
10 of the method according to anyone of the claims 2 to 4.
8. The server (11) according to claim 7 comprising a guest client table (GT1) for identifying to whom said file has been forwarded.

**ABSTRACT**

According to the invention, in a remote computer 17, a method for providing a file comprises the following steps:

- receiving a request for this file,
- 5 • identifying this file as being stored in a distant server 11,
- requesting the distant server to send the file,
- identifying this file as being used, and
- forwarding this file.

10 Besides, in a local server 11, a method for transferring a file from a home server 17 comprises the following steps :

- receiving a request for this file, this request comprising the home server identification,
- checking that this file is not locally stored,
- 15 • requesting this file to the home server,
- identifying the file as being locally used, and
- forwarding said file.

Figure to be published : Figure 4.

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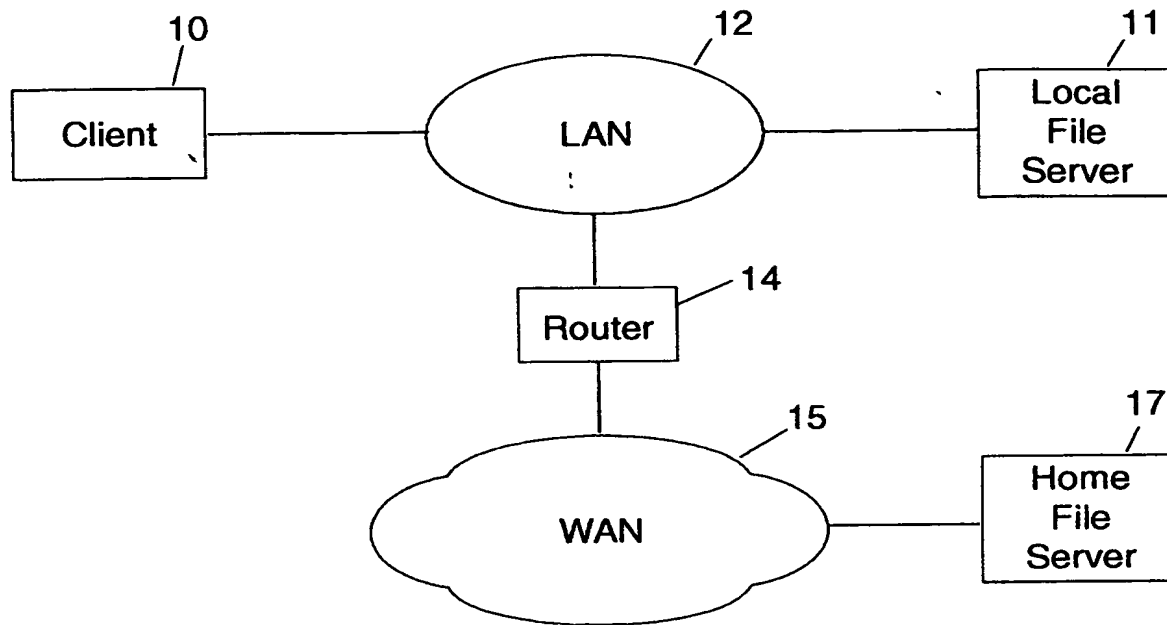


FIG. 1

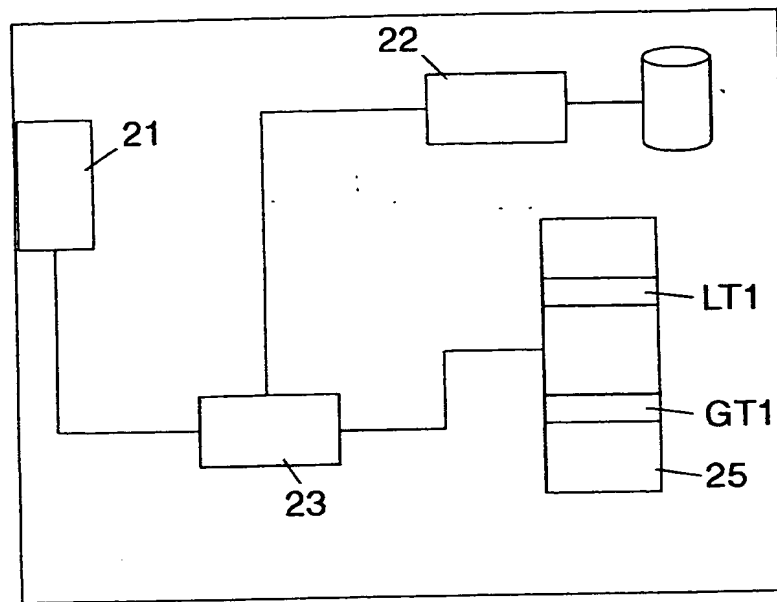


FIG. 2

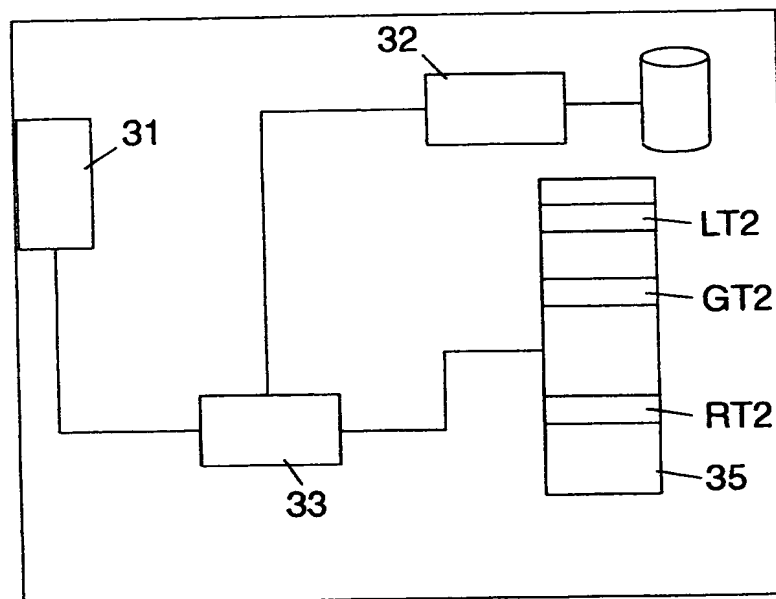


FIG. 3

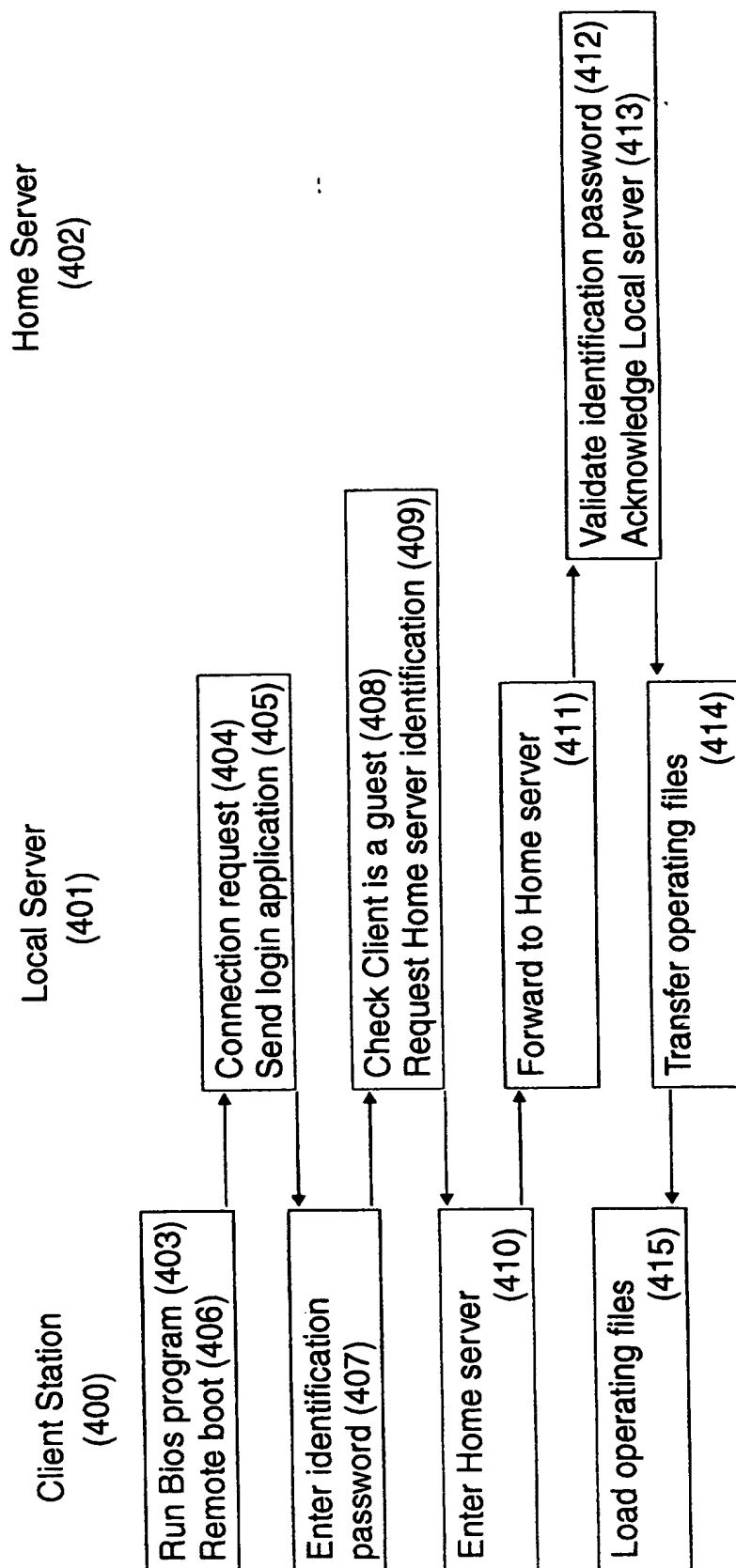


FIG. 4

## File Transfer from Local Server

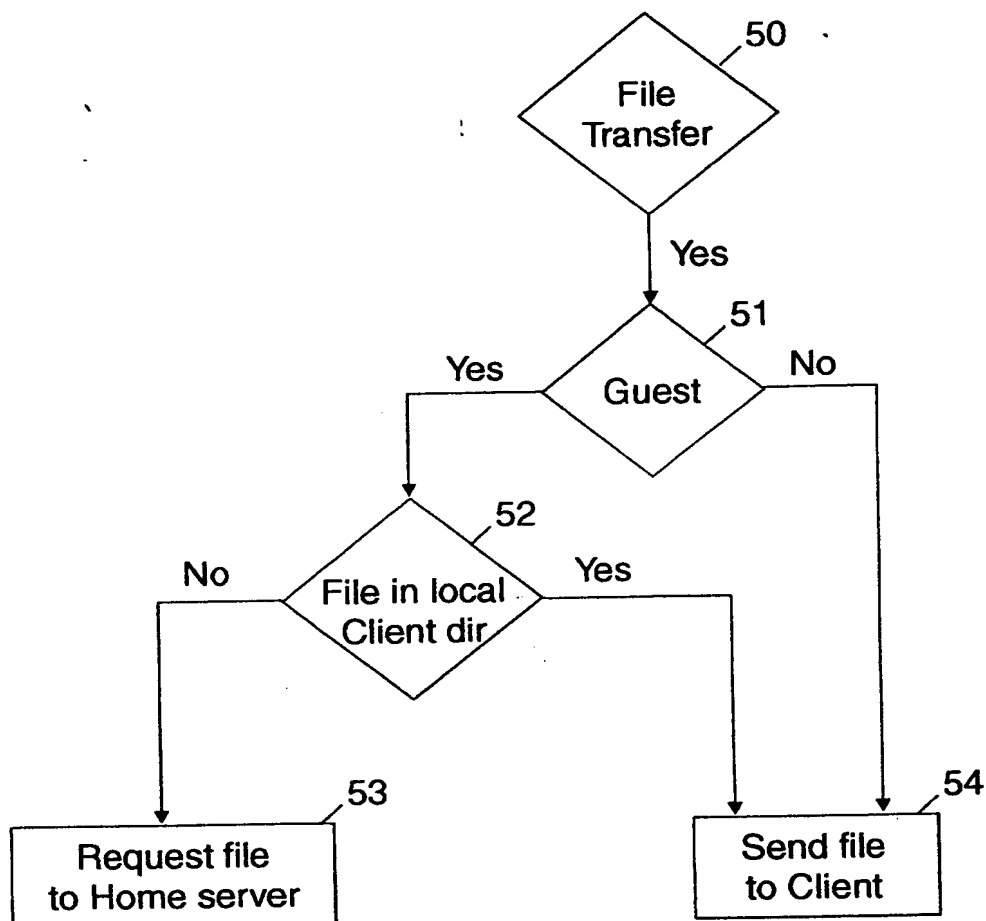


FIG. 5